# Srimtific Ammeritan. 

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

SCIENTIFIC ${ }^{\text {TH }}$ AMERICAN,
At 128 Fulton street, N. Y. (Sun Buildings.) BY MUNN \& Co.


During the operation, last year, of the new Steamboat Law, for the better preservation of life, we had great reason for congratulation on its success during that brief period. We were always fearful, however, of things soon dropping back into their old and terrific condition; and these fears, we regret to say, have been verified. When the law was passed, we stated that however good and stringent were its provisions, they were all worthless if the officers appointed to carry them out were either incapable of, or negligent in performing their duties. pable of, or negligent in performing their duties.
Since the opening of navigation, this year, on our Western waters, three dreadful casualties have already taken place. The explosion of the "Kate Kearney" we described on page 211 ; since then the steamer "Caroline" was burned, and 40 lives lost ; and on the 13 th ult. the "Reindeer" exploded her boilers at the first turn of her wheels in leaving the wharf at Cannelton, Ky., by which from thirty to forty persons were instantly killed, and a great number dangerously wounded. The scene of agony, it is said, baffled all description. This vessel was bound down to take the place of the "Kate Kearney," and was said to be a fine boat. It appears to us that the Inspectors on our Western waters have not done their duty, or these accidents would not have occurred. We hope their conduct will be promptly investigated, and we call upon the government to issue a Commission at once for this purpose. The country holds the President and his Cabinet responsible for the improper execution of the laws. The blood of 150 of our fellow beings, who have been murdered within two months by explosions and burnings, cry aloud for judgment against the guilty.

## The Courage of Science.

Courage in the battle-field is celebrated in history and in song, but little is said of the courage exhibited in pursuing scientific investigations, though often displaying more real elements of bravery than ever were called into action in war. It is said that when Arago and Dulong were employed by the French Government to make experiments upon the subject of the construction and safety of steam boilers, the task executed by the two philosophers was one of as much danger asdifficulty. The bursting of boilers, to which they were constantly exposed in a limited locality, was more hazardous than that of shells upon a battle field, and while military officers who assisted themmen of tried courage in the conflict-grew pale and fled from the scene, the savans proceeded coolly to make their calculations, and observe the temperature and pressure upon boilers almost at the very point of explosion:

## Another Asteroid.

A new planet has been discovered between Mars and Jupiter, making the twenty-eighth of the group of asteroids, which are supposed to be the fragments of a large planet that once existed between Mars and Jupiter. The new member of this group was discovered almost simultaneously at Bishop's observatory in ) London, and at Radliff's in Oxford.

HALL'S TELEGRAPH CLOCK.


The annexed engravings are views of the $\mid$ side by side in a horizontal position. Each of $\mid$ wires are connected with their lower ends. Telegraph Clock of Prof. Alexander Hall, of these magnets is coiled round with one of two The upper ends are not connected, in order Loydsville, Ohio, who has taken measures to se- wires, $f f^{\prime}$, which branch off from and again cure a patent for the same. The great object of this clock is its application to railroads for maintaining uniform time at all the stations (the whole series of clocks in the line being moved
by one) in order to prevent accidents, a number of collisions having occurred by the variations of clocks at different stations, and the time kept by the conductors.
Figure 1 is a front view of a series of clocks, each at a different station on the line of railway, and all operated by one pendulum ; figure 2 is a side view of the clock, constructed like the one with the pendulum in figure 1 ; figure 3 is a back view of the same, and figure 4 is a
top view. The same letters refer to like parts. Figure 5 is a front view of an improvement applied to a common clock, whereby it can be made to work a series of clocks and make them keep uniform time.
This invention relates, 1 st, to certain mechanism which is employed for the purpose of transmitting to the pendulum the motion which is obtained by the alternate attraction of the amatures of two electro-magnets, as an electric current is caused to flow through them. 2nd. It also relates to certain means of closing the circuit as it is changed from one electro magnet to the other, to give motion to the pendulum. 3rd. It also relates to the peculiar arrangement of permanent magnets for the purpose of perfectly securing and retaining the connection by which the circuit is closed, until it is required o be broken or opened.
$A$ is the dial of the clock; B B are the plates, and C C the posts which are of metal, and constitute the frame; $D$ is the back which is of wood; $G$ is the pendulum rod suspended by a spring, $g$, from a post standing out from the back; E E' are two electro-magnets placed
unite in the wire or conductor, $F$, which is supposed to be connected at opposite ends with a battery. The two branches, $f f^{\prime}$, of the wire, F, are for the purpose of making an electric current pass through each of the magnets alternately by breaking the circuit through one
branch and closing it through the other; H is a vibrating beam secured on a center pin, $a$; it has attached to it-at equal distances from the center-the armatures, e $e^{\prime}$, of the magnets. Being thus arranged, by a slight vibratory motion, one of the armatures will be brought in contact and the other thrown out of contact with the poles of its magnet. To the rear end of the beam, H , is firmly attaehed a thin flat steel spring, Z , which possesses sufficient strength to transmit the necessary amount of maintaining power from the beam to the pendulum, and is connected to the upper part of the pendulum rod by a light wire, $c$. The pendulum as it vibrates gives motion to a light lever, I, of the first order which vibrates on a
fixed stud, $i$. This lever is formed of wire and forked at the bottom to receive the pendulum rod, and the rod is allowed some play in the fork. At its top end it carries a small wooden block, $d$, on either side of which is secured a piece of soft iron, $m$, and on the top are two pieces of silver wire, $k k^{\prime}$, which are bent towards opposite sides, and made of wedge form at their extremities. On one side of the lever, I , a pair of permanent magnets, J J , are secured to the back, $D$, and on the opposite side a similar pair, $\mathrm{J}^{\prime} \mathrm{J}^{\prime}$. The magnets of each pair are separated by a piece of ivory or dry wood between them; the pair J J, are intended to form part of the circuit through the branch
wire, $f$, and the pair, $\mathrm{J}^{\prime} \mathrm{J}^{\prime}$, part of the circuit through the branch wire, $f^{\prime}$, and hence the
hat the circuits may be broken, but each pair has two șmall pieces of brass, $j j$, soldered to the upper poles in such a position that the wedge points of the wires, $k k^{\prime}$, will be carried between and away from them alternately by the vibrating of the pendulum, and thus close the circuit through one branch wire, and break the circuit through the other, alternately in succession. When the point of either wire is between and in contact with the pieces, $j j$; the piece of soft iron, $m$, on the same side, is in contact with or near enough to the poles of the magnets to be sufficiently under the influence of their attraction to hold the point in its place and thus keep the circuit closed until the proper time for breaking it. The manner in which the change of the direction of the current from one branch wire is effected, is as follows: suppose the pendulum to be in motion, and to have just completed its stroke to the right as shown in figure 3 ; the lower end of the lever, I, has been moved to the right also, the upper end towards the left, and the point of the wire, $\mathrm{K}^{\prime}$, has just arrived between the brass pieces, $j j$, on the top of the magnets, $\mathbf{J}^{\prime}$ $\mathrm{J}^{\prime}$, as shown in figure 4. The circuit through the branch, $f^{\prime}$, of the wire is just closed, and about to follow the direction of the arrow running to the left, at $F$, above in figure 4, and to the right returning at F , below. The beam, H , in same figure, with the armature, $B$, in contact with the magnet, E , which is now inoperative, is just about to move under the influence of the magnet, $\mathrm{E}^{\prime}$, on the armature, e. The movement of the beam and the pendulum take place, and that of the latter-just before it terminatescauses the point of the wire, $\mathrm{K}^{\prime}$, to be withdrawn from between the brass pieces, $j j$, on the mag , ${ }^{\prime} \mathrm{J}$, and the points of the wire, $\mathrm{K}^{\prime}$, to be
[Continued on the Fourth Page.]

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## Commissioner of Patent's Report for [Ooncluded from page 262.]i

The large number of models belonging to rejected applications would therefore still be left in their present condition, which is constantly growing worse as their number continues to augment. The law requires these to be arranged and preserved in the same manner as those of patented inventions. If a discrimination were allowed, some of these, being mere duplicates of other models, or representing contrivances wholly unpatentable, might be dispensed with, which would partially relieve their present crowded condition. But a considerable proportion of these rejected models are almost as useful as those of patented inventions. They show the different shapes in which, what the office would regard as the same invention substantially, may presentitself, and often furnish a far more satisfactory reference on which to reject a new application than could be otherwise obtained. For these reasons those models should, if possible, be brought from their present dark and incommodious recesses in the basement, and exposed to the clear light of the upper day, suitably arranged for convenient and ready examination.
There seems no other practicable way of effecting this object than to get possession of the large hall, now principally occupied by curiosities brought home by our exploring expeditions. These curiosities have no natural connection with the Patent Office, and would find a much more appropriate resting place within the walls of the Smithsonian Institution. There is plenty of room within that building for their reception and proper arrangement; and the only obstacle in the way is the expense attendant upon the care and custody of these various articles, which those who have the management of that institution do not feel authorized to defray out its limited income specially appropriated to other purposes. A small annual appropriation for this purpose by Congress would remove the difficulty that now prevents the restoration of this large hall to the use for which it was designed. It is respectfully submitted whether the dictates of sound policy, and even simple justice, do not require this small expenditure, in order that room should be provided in the Patent Office for the full exhibition and complete arrangement of all our models. If complete arrangement of all our models. If
this were done, not only could all our models be properly disposed of, but specimens of fabrics and other manufactures and works of art, might be classified and arranged in the manner which the law requires, but which requirement absolute necessity has always compelled the Office to disregard.
The rate of feeş required to be paid into the Office needs a thorough revision. Perhaps they will require to be somewhat augmented; since, while the salaries and the number of persons in the Office have been all the whileincreasing, the fees have remained unchanged-
But an augmentation in amount is not so important as changes in other respects. It is beleived that a tariff might be adopted which leived that a tariff might be adopted which
would be quite as acceptable to the inventors as the present, and at the same time bring a much greater income into the Office. If, for instance, the whole system of withdrawals were at once abolished, so that the inventors could keep their money in their own pockets until it was required to be paid, and when once paid it were never to be withdrawn, the fees might be even less than they are at present, and at the same time the available amount paid into the treasu ry would be greater.
Such an arrangement would be much more convenient for the Office, saving some labor, and the transmission of a considerable amount of money from the Office back to the unsuccessful applicants, and enabling us to know at any time the exact condition of our reliable finances, instead of having, as at present, near $\$ 50,000$ lying idle in the treasury without a known owner. That money might have been much more usefully employed at home until it was wanted here.
Another change connected with this subject which seems to be imperatively called for, relates to the fee required of foreigners. That fee seems to the undersigned enormous and indefensible upon my principle of justiceor sound

$|$| policy. If a Patent is to be regarded as a down | offspring of genius that seek our shores for the |
| :--- | :--- | :--- |
| . |  | right gratuity conferred by the Government on

the inventor, simple equity dictates that we the inventor, simple equity dictates that we
should not impose more onerous conditions on should not impose more onerous conditions on
the subjects of other governments than those governments exact from our own citizens.The stern rule of retaliation would ask for nothing more than such reciprocity.
Within the last two years Great Britain has greatly diminished her former high rates of Patent fees. It is believed that in no country in Europe are our citizens taxed for these pur-
poses as severely as we now tax theirs. It is well known that some European governments impose a lower rate of fees on an American cit izen than he would be required to pay by this Office; and yet we continue to charge a British subject $\$ 500$, and any other alien $\$ 300$, for that which we grant to our own citizens for $\$ 30$. But the granting of a Patent is not a mere gratuity by the Government: it is the recognition of an evident right in the inventor. No title to property can be more just or valid than his who has created that property. The rule of natural justice is the same in this respect whether the inventor be a citizen or an alien. It is right that the Government should charge the patentee with the expense of securing him in his title to what was before rightfully his own; but it is questionable whether a revenue should be sought from this source except in cases of great necessity. Is there any sufficient reason why the general rule should be departed from in the case of an alien?
It may seem reasonable that we should charge an alien the same fee that his government would charge one of our own citizens under like circumstances; but it should be recollected that European governments make no discrimination between natives and foreigners.The high or low rates are the same for all.Under such circumstances retaliatory measures are not resorted to by us in regard to any other subject.
The oppression to which an alien is subjected at home has never been held as a reason or oppressing him here, even prior to his taking steps to become a citizen. If he holds real estate, we do not levy extraordinary taxes thereon commensurate with what that same property would be taxed if owned in his country by one of our citizens. Why should a different rule be followed in regard to property in an invention?
But there is a reason, founded in sound policy, why greater liberality should be exercised cy, why greater liberality should be exercised
towards a foreign inventor than towards the alien owner, of tangible property. He pays a consideration, which the other does not: by taking out a Patent, he makes the subject thereof public property at the end of fourteen years. The benefits of the invention are then secure, and can never be lost to the world.High charges deter inventors from parting with their secrets. Many an invention is thus
strangled in its birth, which, under other circumstances, might have been developed into something of vast consequence to the world.
There are no lost arts under a liberal and well-regulated Patent Office system; and, this is one of its great advantages. If foreign nations choose to place these chief means of human progress in subordination to the requirements of their respective exchequers, we are tion of our imitate them, both by the condipolicy of our government.
Finally, while we extend the free and full benefits of all our institutions to the alien who comes hither to seek them, should not a course equally liberal be pursued in regard to inven-tions,-the creations of his ingenuity? Why should these be subjected to incapacities and discriminating taxation? In regard to them should not the whole world be regarded as one
republic, of which we should seek to render our Patent Office the capitol, wherein every region should be permitted a free representation?We tolerate no onerous discriminations against the foreign exhibitors in our Crystal Palaces.At the cannon's mouth we extend the protection of our flag to the alien who has simply declared his purpose of becoming a citizen, in the same manner as though he were native born.-
Ought we to levy a discriminating tax upon the expres
us?
Fro
From the preceeding considerations it seems evident that a great change should be made as to the fees required from foreign applicants.It is respectfully submitted whether the most convenient, wise, and beneficial rule will not be to abolish all distinctions growing out of geographical considerations, and to charge every applicant a fair remuneration for the trouble given by him to the Office, but no more
Such a course would be just, generous, and noble; seeking to raise no revenue from those who are the special instruments of human advancement, showing a confidence in the capability of our own inventors to cope on equal terms with those of all the world besides, and taking no inconsiderable step in bringing about that great brotherhood of nations for which a higher civilization is gradually preparing the world.
A change in the manner of taking testimony to be used in cases pending before the Patent Office seems indispensable. There is at present no "power to compel the attendance of a witness in such cases, nor to oblige him to answer questions; and it is even doubtful wheth er he can be punished for perjury. It will not
be difficult to provide a remedy for this defect. be difficult to provide a remedy for this defect.
It will be even practicable to enable a party to obtain a compulsory affidavit, or, in other words, to take an ex-parte deposition, to be used the same as an affidavit, which would often be a matter of very great consequence.
The present mode of appealing from the deisions of the Office is extremely inconvenient and in many respects objectionable. The Pat ent Office should possess within itself the entire power to act upon a case up to the time when a Patent issues. The whole matter should then be turned over to the Judiciary. If it be thought expedient to have the action of a strictly legal mind brought to bear upon a Patent before it issues, that mind should form a portion of the Patent Office itself, and be made to exercise a supervisory influence upon all the Patents that are issued by the Office. At present the appellate power is vested practically in either of two highly respectable and inteligent judges, either of whom, under proper circumstances, would no doubt be able to exert a salutary supervisory influence over the Office and its decisions. But the two do not act conjointly, and therefore unity of decision is hardly possible. A few cases go up by appeal out of the hurdreds that are decided by the Office. The appellate, and therefore controlling power, cannot be expected under such circumstances to give tone and character to the action of the Office. Besides, under the present practice, the drawings and models have to be removed from the Patent Office to the office of the respective appellate judges: away from the custody of their proper keepers, they are often injured, and always liable to be destroyed or lost.

If it is thought expedient to have as wide a range for appeals as at present, it is believed that a much more convenient and judicious arrangement would be found in having a judicial officer to hear appeals from the decisions of the examiners, with the power of ultimate appeal to the Commissioner.
Many other minor improvements in the prac tice of the Office might be suggested; but they would look to a general change in the existing laws on the subject. Should such a course be thought expedient, suggestions can readily be made to those having the matter in charge.
There is one very important question, entire y surrounded with difficulties, which deserves a passing notice. It relates to the practicability of preventing the protracted and expensive controversies that are almost sure to absorb a
great portion of value of every truly valuable patent during its proper lifetime, and which lay the foundation for many of the claims for extension presented to this Office.
To remedy this evil some have proposed that notice of the pendency of applications for Patents should be published, and that the Patent afterwards obtained should convey an absolute unquestionable title. But on the other hand
it has been contended that this wouldintroduce greater evils than it would cure; inasmuch as
it might work a great injustice to many who would never hear of the notice, or who might not then be in a condition to engage in the controversy. Others have only proposed that after such a notice the Patent should be incapable of being collaterally broughtinto question, and, like a judgement at law, only be liable to be assailed by a direct proceeding, which would cut off much of the present litigation.But in opposition to this it has been objected that by giving such notice many a poor inventor would be harrassed and prevented from pro curing his Patent, which, if once obtained without the knowledge of evil-disposed opponents, might be at once turned to account. This obection has no small weight.
The least objectionable course on this subect (if any thing is to be done) would seem to be to allow the patent to issue without notice, as at present, and to possess only its present validity; but that the applicant, either in the beginning or at any subsequent time during its lifetime, should be permitted, if he thought proper, to have the notice given; and that the Patent, if afterwards obtained, should not thereafter be capable of being collaterally assailed.
It will be seen that the usual reports of examiners are herein omitted. This has been done in part because it was believed that their me might be more usefully employed; and in part because such reports rendered it almost mpossible to avoid invidious distinctions between patentees who suppose themselves equal meritorious. It was thought a better course to give a clear and brief description of each patent, without further comment, and leave the public to make the proper discriminations. A mere publication of the claims, as has hitherto been done, conveys in most cases no ade quate idea of the different inventions. It is confidently believed that the advantages resulting from having the Patents more fully described, and those which required it, or which could in that manner be made more perspicious, accompanied by a cut showing the parts referred to, would be amply snfficient to justify the expense attending upon such an arrangement.The report has therefore been drawn up with a view to such an illustration of the different Patents. Being, however, unwilling to assume the responsibility of providing the cuts necessary or this purpose, a conditional agreement was made with Messers. Page, Greenough \& Fleischmann, by which the cuts are in readiness for se, if Congress feel disposed to purchase them or that purpose. It is earnestly hoped that uch a course may meet the ready approbation f your honorable body.
The attention of Congress is invited to the importance of providing some adequate means of preventing attempts to obtain patents by improper means. Several cases have occurred during the past year wherein persons interested in pending cases have sent or offered money to the examiners having those cases in charge, for the purpose of securing favorable action upon their respective applications. This has sometimes apparently been done through ignorance or thoughtlessness, but in other cases evidently with a premeditated corruptintent. In cases of this kind it seems proper and necessary that penalities commensurate with the enormity of the offence should be visited upon the heads of wilful transgressors.

## Respectfully submitted,

Hon. Datid R. Atchiinson,
President of the Senate.
Maine Mechanics Association.
We have received the circular of this Association, giving notice of a Fair and Exhibition for premiums to be held in the city of Portland, on the 19th of next Sept., (1854.) It is intended that this shall be a large and creditable affair, and mechanics and artisans from the various States and the British Provinces are cordially invited to become exhibitors. Informaion respecting the rules and regulations, can be obtained by addressing the ex-Committee of which H. C. Barnes, Esq., is Chairman.
Dr. Marshall Hall, of London, is at New Orleans, and, in a series of communications is proposing plans for the draining of that city.


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## Float Protector in Steam Boilers.

Wm. H. Akins, of Ithaca, N. Y., has invented a new improvement for protecting the float which is employed for indicating and regulating the height of water in steam boilers. The float in steam boilers is oftentimes rendered very unsteady in its action by the foaming of the water in the boiler, and it therefore fails to indicate with accuracy the level of the water, and though often used as a means of governing the feed, it is not perfectly reliable. This improvement protects the float by enclosing it within a chamber, which extends from the top of the boiler down to the lowest range of the float, and which only has communication with the other part of the boiler through a number of small openings sufficient to keep the same water level and the same pressure of steam, within as without the casing. The water within this chamber will remain free from agitation during the time the most violent agitation is going on without, leaving the float unagitated, to indicate the water level.

## Reaping and Mowing Machines

John J. Weeks, of Oyster Bay, Long Island, N. Y., has taken measures to secure a patent for an improvement in reapin's and mowing machines, consists, 1 st, I ... employment of a track clearer of a spiral form placed at the side of the machine opposite to the side where the gearing is secured. 2nd. in peculiar means employed for elevating and depressing the front end of the machine for the purpose of enabling the cutter to be set the required distance from the ground, to cut close or otherwise, and to be easily raised over any obstruction that may be in its path. 3d. The fingers are formed with a series of notches in their sides, immediately below the slots in the fingers, through which the teeth of the cutter pass, to prevent the grass or grain from being forced outward by the teeth when acted upon by them. 4th. Each tooth of the cutter or sickle works through the fingera, and every alternate tooth is bevelled in a direction opposite to the intervening teeth, so that if one tooth is so bevelled that its cutting edge works over the upper edge of the slot in the finger, the cutting edges of the two adjoining teeth will work over the lower surfaces of the adjoining fingers, and thus prevent clogging.

## Improved Cotton Gin.

Israel F. Brown, of Columbus, Ga., has taken measures to secure a patent for an improvement in cotton gins, the nature of which consists in constructing the rjbs in such a manner that the parts of them which wear out may be several times renewed without taking the bars from the machine. A cast iron hub with two or more arms at equal distances apart is employed; each of these arms is of the form of the upper portion of a rib, and contains a chiiled part, corresponding with the chill in the arms usually employed. A number of these hubs corresponding with the required number of ribs, are arranged upon a shaft at equal distances apart, and one arm of each hub is made to occupy the position usually occupied by the upper part of a rib. Short ribs corresponding in form with the lower part of the ribs usually employed are secured to a bar, corresponding with the lower rib bar which is usually employed. The upper ends of these short ribs, fit to the lower ends of the arms on the hubs in such a manner that when the hub shaft is properly secured the short ribs and the arms, form a series of ribs like those commonly employed. When one set of arms is worn out, the shaft on which they are secured, has but to be turned in its bearings to bring a new set into contact with the short ribs; it is thus that the wearing parts are renewed, as completely as if a new set of ribs were furnished.

A memorial has been received by Congress, from the American Association for the advancement of Science, setting forth the necessity and advantages of establishing a national Geographical Department

## Halls Telegraph Clock.

 [Continued from the First Page.] brought between the brass pieces, $j j$, on the magnets, $\mathrm{J} \mathrm{J}_{5}$ and thus the circuit through the wire, $f^{\prime}$, is broken, and a circuit is formed through the wire, $f$, following the direction of the arrows, figure 4, running from the magnet, E , along, $f$, above, and back from the thumbscrew, at $f$, on the lower wire below. The the beam and pendulum resume the position the beamFigure 3.

eeth, and are arranged upon the shaft with the $\mid$ This clock is believed to possess advantage teeth of one opposite the spaces on the other; one click falls into a space at every vibration of the beam, and thus causes the ratchets to move half a tooth, thus requiring sixty vibrations of the beam to revolve the arbor once. The arbor has the second hand of the clock fast upon it, and the pendulum is of the proper length to vibrate once in a second ; the second hand therefore makes one revolution in a minute. Motion is transmitted from the arbor, K , to the minute and hour hands by a suitable train of wheel-work.

Figure 4.

otherwise be caused by atmospheric influences and variations in the battery. The method of
closing the circuits through the two electromagnets, and the arrangement for securing the connection, by which the circuits are closed are such as to ensure perfect operation.
$\left\lvert\, \begin{aligned} & \text { shown in said figure. By a repetition of this } \\ & \text { operation, the beam receives a continuous vi- }\end{aligned}\right.$ batory motion, and gives motion to the clock movement, and at the same time furnishes the maintaining power to keep up the motion of the pendulum. The main arbor, $K$, of the clock movement receives motion from the beam by means of two click teeth, $n n$, at equal dison the ratchet wheels, $l l$, on the arbor, as 3. over all other electric clocks. One consists in the application of the power to the pendulum near the axis of oscillation, as in the common clock that is driven by weights or springs, instead of at the pendulum ball. When the power is applied at the ball, variations in the strength of the battery, make the pendulum moveirregularly. Another consists in the mode of applying the power by means of the vibratory beam and spring-the latter preventing shocks and deviations of the pendulum from a uniform isochronal movement, which might

This clock is capable of communicating mo tion to a number of other clocks, and to them the motion may be communicated in a number of ways, but the most simple plan is to furnish each of the subordinate clocks with a single electromagnet, and to carry one of the wires, $f f^{\prime}$
around the whole series of magnets, before uniing it with the wire, $F$, as shown in fig. 1. A beam with the armature of the magnet attachd to one end, and with a light spring at the other, applied in such a way as to throw the armature away from the magnet when the circuit through the wire is broken, will serve to give motion to the main arbor of each clock, in he same manner as the beam, $H$, gives motion to arbor, K .
Figure 5 represents a new mode of breaking and closing the electric circuit by means of an ordinary clock, when the pendulum is propelled by weights or springs. This improvement dispenses with a great portion of the battery power, which is required in the other case where the regulator or governing clock is moved by electricity, as described, so that a common regulator clock with this circuit breaker attached, can break and close the circuit fof a line of clocks, without interfering with the motion of the pendulum in the least. There is a brass wheel, B , secured on the crown shaft, around the rim of which are thirty ivory pins, $a a$, equi-distant, with thirty intervals of brass of equal surface. On either side are binding screws, D D, from which wires pass in the usual manner to the battery, and through the line of clocks. To each of these binding screws is secured a small spring, $b d$, with a platinum point resting on the surface of the key wheel, to secure the connection of the electric circuit. The point of the spring, $d$, passing near the shaft, rests continually on the brass surface, while the point of the spring, $b$, rests alternately on the ivory and brass as the crown shaft revolves. Thus at one vibration of the pendulum, the platinum point of the spring, $b$, rests on the ivory pin, or other non-conducting substances, which breaks the circuit through the whole line of clocks, when the armatures are drawn back from the magnets, by means of a small Fig. 5.

spring, in the usual manner; but at the next motion of the pendulum the key wheel moves a sufficient distance to bring the platinum point in contact with the brass, which closes the circuit throughout the line of clocks, bringing up the armatures of each magnet, which gives motion to the works of each clock on the line as described. Substituting this improvement for the pendulum clock, figure 1 , its applisation to move the whole line of clocks in that figure will at once be understood.
One great advantage accompanying this invention is the employment, by Prof. Hall, of an electric battery upon a new principle, the expense of which is very small indeed. We have one of these batteries in our possession, and consider it to be one of the most economical we have ever seen.
Prof. Hall has sold a portion of this invention to James M. Thomson, of 505 Broadway, and Messrs. Smith Reeve, \& Co., machinists, corner of Canal and Center streets, who can be consulted in reference to the matter. The attention of railroad companies is invited to this improvement, as one for increasing the safety of the travelling public.
The inventor proposes giving a public demonstration with a series of telegraph clocks in a short time, having been tendered the use of the Merchants Exchange in Wall street, for that purpose.

More information may be obtained by letter addressed to Prof. Hall, at Loydsville.
Sewlng Machine--Important Patent Case.
We have received a newly printed copy of the late decision of Judge Sprague, of Boston, in the Sewing Machine Case, of Howe, vs. Underwood. Having no room to present the subject clearly in this, we will take the opportunity of doing so in our next number. This decision is of greatimportance to all those who use, construct, and sell sewing machines.

## Sinintific Ammerican.

NEW YORK, APRIL 8, 1854.
The Patent Office Report.
The conclusion of the Report of the Commissioner of Patents, which we publish this week, together with that which was published in our last number, affords much matter for reflection to all those who are interested in our patent system, and the number of such is not small. The first striking feature in the Repor't is the excess of the expenditure over the income. The amount received was $\$ 9,471,11$ more than in 1852, and the expenditures have been greater by $\$ 36,952,92$. Allowing $\$ 11,923,35$ to have been paid for furniture, the increase of current expenses is still $\$ 25,029,57$ more than for 1852. The additional force made to the examining corps, \&c., greatly increased the expenses; but for all this, it is stated in the Report that the deficit is not caused by any extraordinary increase of expenses for the transaction of the real business of the Patent Office, but for agricultural purposes. The amount paid out last year for such purposes amounted to more than $\$ 7,000$. This was expended for collecting agricultural statistics, and seeds of various kinds, purchased and received from abroad. We believe that an agricultural bureau has done some good, and may be productive of much more, although some members of Congress have declared that the seeds distributed by it were always liable not to grow. But we protest in the name of all our inventors against the appropriation of money from the patent fund for such purposes. Such appropriations by Congress are neither just nor honorable. The patent fund should never be applied for any other objects than those connected with invention and discovery. Appropriations for agricultural purposes should be made from the National Treasury, as the object is national, and has nothing to do with new inventions. There is not a single farmer in our country who will say that it is anything but unjust to tax our in ventors yearly for collecting agricultural statistics. It would be equally as just to appropriate $\$ 7,000$ per annum of the Post Office Fund for the Patent Fund, as to appropriate the latter for agricultural purposes. In making these remarks we do not wish to be understood as speaking against appropriations for agricultural purposes; we only speak against the injustice of such appropriations from the inventors fund.
The working expenses for this year (1854) will not be so large in proportion as they were for last year, as the Commissioner says the present force of the office will be able to issue 1,200 patents. We hope Congress will take prompt measures for increasing the room required for the real business of the Office, and remove the collections of the Exploring Expedition, (which have no business there) from the large hall, and allow it to be appropriated for the legitimate purpose of its erection. Our inventor's rights have been too long disregarded, with respect to a proper exhibition of their models. This clearly illustrates an important fact, namely, that however much we may, as a people, be distinguished for inventive genius; however high a place our nation justly holds for being distinguished in arts, sciences, and inventions, the members whom we send to represent our interests at Washington, with few exceptions, are neither by habits, tastes, nor profession, men of science, nor lovers of the arts-agricultural or mechanical. This should not be; our farmers and mechanics should form at least seven-tenths of the members of Congress.

It will be observed that the Commissioner has recommended that when application is made for a patent, that only the amount not allowed by law to be withdrawn, shall be deposited at first, and that the total amount need only be sent when the patent is passed for is sue. This is a good idea, it will save all the trouble of withdrawals, and all the uncertainty about the disposal of such moneys.
A reduction of the patent fee for foreigners is also recommended; such a reduction we have always advocated, and we hope our patent
a fee of $\$ 100$ for all foreigners would be very satisfactory as the first step of reform.
There two are other questions of great importance suggested. One relating to a reform in the Patent Laws for trying appeals, before patents are issued, and the other for mitigating the great amount of litigation which seems to attend every valuable patent. We believe it would result in great dissatisfaction with the office if any more power were concentrated in it than there is at present. We do not think there can be much danger in carrying a model from the Patent Office to the court where the appeal is to be tried in Washington, but all appeals should be facilitated, in order to have as little delay as possible. The present Commissioner of Patents is perfectly capable of judging of any question of fact and law, but if the ultimate appeal was to be made to the one who appointed the Examiner from whose decision the appeal is taken, some might be with propriety suspicious of an undue regard to the views of the latter.
The great expense of litigation attending very profitable patents, is a serious evil, but we confess we cannot see any remedy for this, excepting in the U. S. Courts, ordering every trial to take place promptly. It would not be constitutional to pass a law granting an absolute and unquestionable title to any patent. Owing to the nature of our Federal Government, every citizen can demand a trial by a jury of his peers, and that in the place where he is sued for trespass or infringement. No citizen should be deprived of his property without due process of law, and to make a patent absolute, would involve such power. This Report of the Commissioner certainly contains many excellent suggestions for reform in our patent code; we can heartily subscribe to the most of them, a all our inventors no doubt can. We hope they will receive due and just attention from Con gress.

## Good Common Roads.

There are four kinds of common roads known and used in our country, namely, mere trodden paths, paved, McAdamized, and plank roads. Good common roads have been held up as an evidence of a country's civilization, but be this criterian of civilization a correct one or not, one thing we know, they are exceedingly pleas ing, comfortable, and beneficial to the people who have the good fortune to possess them. Throughout the rural districts, in almost every part of our country, the people suffer great incouvenience from bad roads--especially in the spring when the frost is leaving the ground, and during long periods of wet weather. Of this all are well aware, but even very near our cities, as we have had opportunities of witness ing this year already, the common roads, are also of ten rendered almost impassable. It would be a great benefit to our people, especially our farmers, if all our rural districts were interlaced and connected with our cities, by firm and substantial common roads, such as would not be converted into rivers of mud, as too many of them are, by a few heavy showers of rain The Romans made excellent paved roads, "in the brave days of old," and in modern times McAdam proved himself to be one of the greatest benefactors of our race by first constructing roads of small pieces of broken granite. (If we knew who the inventor of plank roads was, we should like to pay him a like tribute of re spect.) It is difficult in many parts of our country to obtain stones, either for paving or making McAdamized roads, but where the right kind can be easily procured, the latter kind of road is to be preferred. We consider plank roads one of the most beneficial inventions, for ommon travel, ever introduced into our coun try. The materials to construct them can be obtained in almost every part of our extended domains, and we cannot but speak strongly of their usefulness, utility, and economy, and endeavor to impress upon the minds of our farmers, and those who dwell in the rural districts, he great benefits that would accrue to them by he construction of such roads between farm and farm, village and town, country and city We admit that no inventions have tended to advance civilization and benefit man more than those which have been applied to facilitate pub-
roads, and it is encouraging to know that our country, which is naturally so well adapted for railroads, has now more lines in operation and under contract, than all the other nations of the world put together. But such roads cannot supply all our travelling wants; common roads always have been and ever will be a necessity. The parties most interested in good common roads, are those who own carriages and horsesour farmers chiefly. For public travel and the transport of heavy goods, railroads are the grand desideratum. But when a farmer wishes to draw a load of potatoes, or wheat, or butter. a short distance to market, he cannot afford to pay for a steam carriage to draw the same on a common road; he therefore employs the means which are at his command; he harnesses his team and drives it jocund, whistling as he goes, if the road is good. There are some who keep continually bumming about the use of steam carriages on common and plank roads, but these are not required on such roads -such roads are required for totally different objects. There are some who are loud in advocating impracticable schemes, and extermina ting insurmountable difficulties on papere They can vault over mountains on crutches and march over seas in paper boots, and yet somehow or other, they never do anything of note, although they are always about to do something. If steam carriages could be economically employed on common roads, those who ave advocated them have had abundant time and opportunities for proving themselves to be something more than mere projectors.
We have said this much about the necessity of having good common roads, because so much interest is absorbed in our great and grand railroad projects, that the minor-but none the less necessary on that account-common road are liable to be overlooked. The commence ment of the favorable season for out door work on common roads, we consider is a good time for urging these remarks upon the attention of those who are most interested; we therefore hope that while joint stock companies are making our country the great emporium of railroad enterprise, that our farmers and those who reside in the rural districts will set about to exert themselves, and make it equally famous for good common roads.

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Fig. 1. Fip
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Figure 1 is a perspective, and figure 2 a transverse section through the tap and collar of J. Ball's patent water and gas pipe. This pipe is composed of an interior tube, E , made of prepared hydraulic cement, covered with a pipe of sheet iron, C , such as stove pipe, and which is riveted along its length, as shown in figure 1.
A is a metal collar placed around the part where two sections of pipe are united, and is filled between with cement, F. The pipe for the reception of the cock, B, is tapped through the middle of the collar, A at $c ; \mathrm{D}$ is the interior of the pipe- When laid in the earth these pipes (to protect the sheet iron from rusting) are covered on the outside with a coat of hydraulic cement. The collar, A , for the purpose of receiving a tap and rendering the pipe strong at the joint, is an excellent device. This pipe is presented as a substitute for cast iron and other metal pipes for the supply of water for cities, or for any other purpose of conveying water, \&c., where cast iron or lead or other

of cement, the water will never act upon it as upon a metal pipe to oxydize the same. It is herefore indestructible, so far as oxydization is concerned, and the water that flows through it, is not rendered impure by its decay. It is said to be stronger than the common cast iron water pipes in general use. In many places this pipe has been in use for some years, especially at Saratoga Springs, where 25,000 feet of thas been laid, and the Water Commissioners consider it preferable to iron pipe-being cheaper and more durable. We believe it to be a very durable and excellent kind of pipe, and suitable for some situations-such as marshy localities-where metal pipes cannot safely be used. For more information respecting this ind of pipe, we would refer to the advertisement on another page, of the Patent Water and Gas Pipe Co., of which Mr. Joseph Battin-the inventor of the celebrated Coal Breaker-is President.

Premium Bank Bills.
Although we have no personal interest whatever in the matter advertised in the "Scientific American," a few weeks ago, offering a premimium for a perfect mode of preventing the alteration of bank bills, yet we dare say we have received more communications on the subject than the parties who offered the reward. Upon the question as presented in that advertisement we cannot decide, because we have nothing to do with it whatever; we therefore will not express any opinion upon this or that plan presented to accomplish the object, so as to meet he views of the Bankers.
We have a letter now before us from S. Sully, of Ida Mills, Troy, N. Y., who proposes to form bank notes by weaving any design in silk, linen, or cotton, in black on a white ground. These notes could all be made on the Bank premises, and several could be woven in one and afterwards separated. Geo. A. Clark, of Fall River; Mass., proposes to manufacture bank bills in nearly the same manner. E. F. French, of Franklin, Vt., proposes to perforate the letters which express the denomination of the bill. M. Gerhard, of Delaware, Ohio, proposes the same plan exactly. N. Young, of Lancaster, Ohio, in a second letter proposes the same plan, only that it shall be the name of the bank which shall be perforated, and that a blank space should be left in the center of each bill for this purpose. Geo. Harvey, of Richmond, Va., suggests that nearly the whole face of the bill be occupied with the figures expressing its value, so that the whole would have to be altered.

An Apology.
We owe an apology to the "Polytechnic Journal,"-and it affords us pleasure to make it-in regard to the statement made in our last issue to the effect that the Commissioner's Report, as published in that journal, was obtained surreptitiously. Its appearance in advance of its regular publication by Congress led us to institute inquiries as to how'it was procured, consequently we addressed a note upon the subject to the Commissioner of Patents; he replied that he had no knowledge of the matter. Since the date of his first letter, he has again written us, stating that copies were obtained from the records of the Patent Office, upon the same terms as other documents are furnished; this of course is satisfactory, and assures us that our cotemporary procured the Report in a fair and honorable manner
It seems that it was entered upon the records of the Office, thereforo copies could not be refused to any one who felt willing to pay for them. This is a new and excellent plan, and if carried out in future, the readers of the "Scientific American" may expect the reports to be published in our columns as soon as they are sent to Congress.
Judge Mason, the Commissioner of Patents, is now absent from the Patent Office, on a short visit to his friends in Iowa. He is expected to return in about four weeks.
A number of ships which have recently arrived at this port, report great quantities of ice in the Atlantic. The Pacific wasedetained for some hours among icebergs in her recent voyage.

Water Wheels---The Turbine---Article 2.
[Continued from page 230.$]$
Early History of Turbine Water Wheels. -19. By the term "turbine," is understood, hat class of re-action wheels which receive the water with a whirling motion.
Some short time previous to 1830, it was discovered that, by giving the water a motion with that of the wheel previous to its acting on a re-action wheel, the eff ect would be greater than when the water came into it without motion in that direction.
Z. and A. Parker obtained a patent, October the 19 th, 1829 , embracing this principle in the specification. Mr. Parker says he discovered the principle, accidentally, in 1827.
In 1823, M. Fourneron of France, commenced an investigation of the action of water on wheels, which terminated in the discovery of the celebrated wheel which bears his name.He wrote an essay, which was published in a Journal in France, in 1834, giving a full description of the invention, and several machines which he had erected; and was awarded a prize of six thousand francs for the successful introduction of his wheels into use.
It is somewhat singular, that the discovery should have been made on both continents at the same time. Fourneron says he established his first turbine at Pont sur l'Ognon, in France, in the year 1827: the same date of Mr. Parkers discovery in the United States.
The original discoverers, not understanding the principles of action, did not make their claims, when applying for a patent, broad enough to cover the whole grounds; and in consequence, since 1830, a number of patents have been issued to persons of the United States, embracing their principle to a greater or less extent. While all who observe the operation of these wheels see their superior action, few, or none appear to understand their principles of action. And most writers on the subject, appear to mistify, rather than elucidate the action of water on this class of wheels.Some seem to think the water acts by impulse, some by re-action and re action and percussion combined; while many bring in cetrifugal and other unknown forces as auxiliary. Experimenters differ so widely in their reports,-some who are interested giving such extravagant re-sults-that the studying of the elements of mechanics, and becoming familiar with the few principles of nature which originate, carry on and terminate all mechanical movements, are the only means by which millwrights can gain a correct knowledge of the action of the machine. They will then perceive that there is no great mystery about the action of water.

Principle of Action.-20. The principle by which the turbine water wheel is made to be more efficient than the common re-action wheel, is very simple, and well known to ail mechanicians. It is that principle (see art, 5) which causes a bullet dropped from the ceiling of a steam boat to strike the same point on the floor, as if the vessel were still; that which enables passengers or a car moving 40 miles per hour, to walk forward with as much ease as aft; and the satelites to respect their secondaries as their center of motion, as they would do if the primary was removed and they at rest.
That principle which causes two bodies moving in the same direction, with equal velocity, to act on each other as if at rest.
21. Notwithstanding the earth and moon act on each other while moving around the sun precisely as they would do if the sun were removed and they moving in a right line or were not progressing at all; yet, as some suppose that centrifugal force varies the action of bodies on each other on the earth, it may be necessary, before proceeding to discuss the above principle, to illustrate that principle of inertia by which a body in motion opposes being compelled to describe a curve, called centrifugal force. On investigation it will appear, that, notwithstanding the high authoritiy to the contrary, that there is no such force as centrifugal, and that the very term (centreflying) is erroneous. For bodies moving in a circle have no tendancy, whatever, to fly from their circle of motion; but merely oppose being compelled
to move in a curve; (art 3) and are continual-
not from the centre, but perpendicularly to a
line drawn from the centre through the body line drawn from the centre through the body.
If "centrifugal force," be a correct term, then If "centrifugal force," be a correct term, then the same; viz: That principle impressed on on all ponderable matter by which it tends to remain in that state in which it is placed.

## Fig. 1.



Figure 1.-if, while the body B, fig. 1, i moving around C , as its center, on arriving at the point $B$, in the circle, it should have its connection with C , destroyed, it would not approach $A$, on the opposite side from the centre C, but would move towards $D$, perpendicular to a line drawn from $C$, through $B$ to $A$; and would have just as great a tendancy to fly from A, as from C. And moreover, its velocity will be no greater after its connection with C , is broken, than when moving in the circle; which would be the case if it tended to fly from C.See "Scientific American," vol. 7, page 363, for a further illustration of this principle.
22. It was demonstrated, art, 18 , that the simple re-action wheel could only approximate to an effect equal to half the power. On an inspection of its principle of action, it will readily be perceived that the machine is defective; for the water has an actual velocity after leaving the wheel equal to one half that with which it issues; Therefore, one half the power is, necessarily lost. Now if the actual velocity which the water has after acting on the machine, can be consumed in, or prevented by giving the water a motion previous to acting on the wheel; if a machine can be so constructed that it will move as fast as the water issues, and the pressure, or re-action independent of a retarding force will equal that due half the head, we should have a machine realizing the powerIf one half the head can be used to give to the water a motion in unison with that of the wheel before acting, and the other half used to impell the wheel by pressure, by art, 20 , this may be effected.
and the water in $\mathbf{A}$, will revolve with the ves sel. If by any means the velocity of the periphe-
ry of the vessel $\mathbf{A}$, should be so retarded that it revolves just as fast as the water issues at the jets; by art 20 , the water will re-act at $b$, and tend to impell the vessel A , as it would do if A was at rest and the water came in at $a$, perpendicularly. Here we have $v=w=\mathrm{V}$, hence, $\mathrm{E}=m \div g(\mathrm{~V}-w \times v) w=\mathrm{P}$, the power.
If a friction brake be applied to the shaft $s$, so $_{\mathrm{u}}$ adjusted that the periphery of the vessel revolves with a velocity of 16 feet per second, and twenty pounds of water escape per second at $b$, then the pressure at $b$, (and consequently its $b$, then the pressure at $b$, (and consequently its
equivalent on the brake) will equal the weight equivalent on the brake) will equal the weight
of water that escapes during the time that a body would acquire an equal velocity by falling from rest, and by art 7, as heavy bodies will by falling from rest acquire a velocity of 16 feet per second in half a second of time, the constant pressure at $b$, and on the brake, wil equal one half the weight of the water that issues at $b$, per second; or, 10 lbs . Which being multiplied by the velocity of the wheel per second, 16 feet, will give the effect; equal to 160 And the weight of water issuing, per second 20 lbs . multiplied by the whole highth, 8 feet will equal the power, 160. Hence the effect is equal to the power. $\mathrm{E}=20 \div 32(16-16+16)$ $16=160$. And, $P=20 \times 8=160$.
To demonstrate that the effect is doubled by apylying one half the head to giving the water a motion before acting, and using the other half to propell the vessel $A$. Suppose the water at $a$, to come into the vessel $\mathbf{A}$, perpendic ularly, and $\mathbf{A}$ to revolve as fast as the water issues at $b$, equal to 16 feet per second. Then the whole of the force at $b$, will be expended in giving the water as it enters the vessel A , a velocity equal to that of the vessel. The retarding force will equal the impellent force, and the effect will be nothing. $w-v=v$, consequently the expression, $m \div g(v-w \times v) w$, vanishes. But if the vessel A, move half as fast as the water issues at $b$, equal to 8 feet per second; then the retarding force will equal half the impelling force, and the effect will equal half the power. $E,=20 \div 32(16-8+0) 8=40$, and, as in this case the head is the highth of the vessel $A, P=20 \times 4=80$, or the effect equals half the power. Hence, the effect of the machine is double by using one half the head to give the water a whirling motion before acting.
If the vessel $A$, be suffered to revolve with a greater or less velocity than that with which the water issues at $b$, and comes in at $a$, the effect will be diminished. But a slight varia tion will not alter the effect perceptibly; for if A move one eighth slower or faster than the water at the jets, the effect will be reduced on-
water, that it had taken up a portion of the paint, and having analysed the water I found it to contain a very minute quantity of it, sufficient, however, if a large quantity of the water were taken, to produce those fearful diseases peculiar to lead poisonings."

$\mathrm{J}_{\text {AMES }} \mathrm{M}_{\text {ANLEX }}$

New York.
[We advise all persons to avoid using paintd wooden pails. A coat of varnish, on the outside is all the embellishment we ever desire to see on a water pail.

## Observation and Inquiry.

Sir Edward Bulwer Lytton recently delivered an address before the five Societies of Edinburgh College, on the occasion of his inauguration as Honorary President of these Associated Societies. In the course of his address he made some remarks on the habits of observaion and inquiry, which we commend to the attention of all our young men. They are as folows :-
"Nature indicates to the infant the two main elements of wisdom; nature herself teaches the infant to observe and to inquire. You will have noticed how every new object catches the eye of a young chld, how intuitively he begins to question you upon all he surveys,-what it is? what it is for? how it came there? and how it is made? who made it? Gradually, as he becomes older, his obserration is less eager. In fact, both faculties are often troublesome and puzzleing to those about him. He is told to attend to his lessons and not ask questions to which he cannot yet understand the replies. This reckless vivacity is drilled into mechanical forms, so that often when we leave school we bserve less and inquire less than when we tood at the knee of our mother in the nursery. But our first object on entering upon youth, and surveying the great world that spreads beore us, should be to regain the earliest attributes of the child. What were the instincts of he infant are the primary duties of the student. His ideas become rich and various in proporion as he observes,-accurate and practical in proportion as he inquires.
The old story of Newton observing the fall of the apple, and so arriving by inquiry, at the laws of gravity, will occur to you all. But this is the ordinary process in every department of intelligence. A man who observes more attenively than others had done, is something in itself very simple. He reflects, tests his obserations by inquiry, and becomes the discoverer, he inventor, enriches a science, improves a manufacture, adds a new beauty to the arts, or, f engaged in professional active life, detects, a physician, the secret cause of disease, exracts truth, as a lawyer, from contradictory evidence-or grapples as a statesman, with the complicated principles by which nations flourish or decay. In short, take with you into all your studies this leading proposition, that, whether in active life, or in letters and research, a man will always be eminent according to the vigiance with which he observes, and the acuteness with which he inquires. But this is not enough-something more is wanted-it is that esolute effort of the will which we call perseverance. I am no believer in genius without abor; but I do believe that labor, judiciously applied, becomes genius itself.
Success in removing obstacles, as in conquering armies, depends on this law of mechanics,he greatest amount of force at your command concentrated on a given point. If your constitutional force be less than another man's you equal him if you continue it longer and concentrate it more. The old saying of the Spartan parent to the son who complained that his word was too short is applicable to everything in life,—"if your weapon is too short, add a step to it." Dr. Arnold, the famous Rugby schoolmaster, said the difference between one boy and another was not so much in talent as in energy. It is with boys as with men : and perseverance is energy made habitual."
One of the Aldermen of our City while re cently discussing one of the regulations of our City Railroads, said "the carelessness of the ganagers of the Hudson River Railroad was unexampled in the annalsof navigation!"

Fig. 2.-Let A, represent a cylindrical vessel on a shaft, or spindle stopped at $t$; whose depth is four feet. Let $B$, be a cistern placed over the brim of A, and filled with water to the highth of four feet above the surface of the water in A. $a$ is a bent tube, (see it enlarged t $C$ ) inserted at the bottom of $B$, conducting the water into $A$, at a tangent to its inner surface; $b$ is a similar tube to $a$, at which the water issues from A, horizontally, at a tangent to its inner surface, in a direction contrary to the movement of A. $c$ represents a section of the tubes $a$, and $b$, on a larger scale, and in another position ; $e$, being the orifice at which the water escapes, and is directed towards the front at $a$, and $b$, in the figure. The scale at the right of the figure shows the highth in feet. When $a$, and $b$, are both open, and B, kept full of water; the vessel $A$, will revolve in a irrection contrary to that with which the wate ly one sixty fourth (1.64) of the whole amount. But if its motion should be increased, or reduced one half, (to 24 , or 8 feet per second) the effect will be reduced one fourth.
And if the issues $a$, and $b$, be dissimilar in size, the effect will be less; though not appreciable, when the difference is small; for when the orifice at $a$, is twice that at $b$, the diminution in effect will only be one tenth. This may be demonstrated by lowering the water in the cistern $B$, down to the dotted line one foot above $a$, and enlarging the orifice at $a$, to double that at $b$, and letting $A$ revolve at a mean rate between that of the water at $a$, and $b$,-equal 12 feet per second, when the effect will be 9 , and the power 10 .
Here we have a machine that will realize as great a percentage of the power as it is possi ble to obtain; the principle of action of which is embraced, to a greater or less extent, in all turbines. And the efficiency of the different varieties of this class of motors, depends entirely on how farthis principle is carried out in their operation.

Danger of Painted Pails.
"I would desire to direct the attention of the readers of the "Scientific American," to the danger of using pails which are painted inside, for containing water, for domestic purposes.The oxyd of lead with which they are painted, is a dangerous poison, and I know that it is productive of evil in many cases. Last week, having occasion to take a drink of water from painted pail, which had been in use for some
issues at $b$, and in the direction of that at $a$

$\rightarrow+\rightarrow+\infty$
nths, I was convinced from the taste of th

TO CORRESPONDENTS.
D. B., of C. W.-Have your spoons quite free from
grease. then have a solution of sal-ammoniac ready;
dip them into this and then into the molten block tin,
and you will be likely to suoceed. and you will be likely to suoceed.
D, D., of N. Y.-Prof. Bartlett's
Doph., of N. Y.- Prof. Bartiett's (of West Point) Philocity, is perhaps the best work you can purchase; the price we believe is three dollars.
A. S., of Tenn.-All iron boats are built with air-tight
compartments involving the same principle as that exhibited in your sketch.
M. H. s., of Ky.-You have no doubt read the articles
we published on setting the wheels of carriages, these
were called forth by an inquiry from us, asking for inwere called forth by an inquiry from us, asking for in-
formation. If practical carriage-makers are ignorant J. M., of Pa.-Your idea to prevent damage from the breakage of car axles appears to be good. You had better submit it to Mr. Mulholland and get his adviceJ B \& Co.. of Pa.-For yours in regard to the punch-
ing machine. we are much obliged. g machine, we are much obliged.
S.K..of Albany-Your alleged improvement in barber's
chair appears to be new. We wrote you on the 27 th inst., but are not certain of having made out your proper name, as the signature to your letter is about as bung. ling as anything of the kind we have ever seen: there is no excuse for this because you are a very good writer.
A. H. H., of Va.-Tredgold is the most elaborate work on the Steam Engine, but it is very dear, get the work
by the Artisan Club; it is very good. Hodge on the steam engine is also good.
D. McK., of $\mathrm{Pa}-\mathrm{W}$
Dade a voya of Pa.-We believe the "Vanguard" never made a voyage from Galway to this port ; the "Orion"
made one, and was wrecked. Wedo not know whether the "Vanguard" made regular passages from Greenock to Liverpool in 14 and 15 hours or not: but the
" Fire King has often done this, yet that is no evidence that these vessels $w$
in from 7 to 8 days.
strong solution of the sulphat pour into the auger hole cover the inlet with pitch, we are of opinion that would tend to make the spiles endure much longer.
J, P. B.. of Ky.-There is some information about mill ing in the back numbers of this volume, which we can-
not send you. The subject is one of great interest, and we may have considerable to say on it hereafter. The nominal horse-power of an engine is calculated by the
mount of steampressure on each square inch of the mount of steam pressure on each square inch of the There are 1884948 (nearly nineteen) square inches area in your piston.
W. McC., of Phila.-We have never heard of the offer W. A. P., of Miss.-A compressed air telegraph will operate, but we cannot tell the distance a person's voice may be heard in the tube. We do
a telegraph could be made to pay.
J.G., of R. I. -Messrs. Rossell \& Co., Trenton., N. J. have a a patent for welling cast steel to cast iron and
can furnish any informationupon the subject which you may need.
H. s . of
may need.
H. S., of Ky .-We do not consider your method of cannot therefore advise you to make an application. G. W. McG., of Mich.-Your improvement in fire arms is, we think, new and patentable. You had better send us a model of it.
A. R. V., of N. Y.-The idea you suggest in regard to
improvement in saw mills, is a very good one, and we improvement in saw mills, is a very good one, and we
think it novel. We would advise you to send a sketch and description of $i$ t; be very carefulin preparing them, so as to enable us to get a clear understanding of the
case. of tanning. You will find it in some of the numbers of this volume.
G. \& C. M., of Mass.-We are in receipt of your favor and have carefully examined the sketch of the gover-
nor. You will find illustrated in Vol. 8, Tremper's Pa-
not nor. You will find inlustrated in vol. 8, Tremper's Pa-
tent Governor, which is substantially the equivalent of
your's. S. N., obtained a patent for an improvement in ventila-
tors for rooms, designed for hot climates, but for some tors for rooms, designed for hot climates, but for some
cause it was not adopted, your plan is entirely superseded by his.
A. R., ofN. Y.
A. R., ofN. Y.-In volume 8, of the Scientific American,
you will find an engraving of a car axle, which is diviA. R., ofn. Y.-In volume 8, of the Scientific American,
you will find an engraving of a car axle, which is divi-
ded in the center and secured by a sleeve or collar fite ded in the center and secured by a sleeve or collar fit
ting closely. When the car is passing over a curve one enting torsion and subsequent breakage of the axle. We have very frequently alluded to this question in the Scientific American.
munication by letter, and we presume you will find it in the Post Office.
Money received on account of Patent Office business
for P. H., of N. Y., $\$ 25$; N. K., of Pa.., $\$ 25$; R. K., of Mass., \$20; D. P. B., of Cal., $\$ 30$; W. \& G., of Pa., $\$ 275$ G. F. W.. of Pa., $\$ 55 ;$ T. P., of N. Y., $\$ 250$ : C. J., of R
L., $\$ 550$; G. W. P., of N. H, $\$ 32$; H. \& P., of R. I, $\$ 30$
 of Ct., $\$ 30$ : W. S., of Pa., $\$ 250$; J. J. W., of L. I., $\$ 30$;
J. B., of N. J., $\$ 55 ;$ S. $\&$ B., of N. Y., $\$ 55$; C. F. B., of R. I. ., $\$ 25$; H. H. W., o,
P., of N. Y., \$25.

Specifications and drawings belonging to parties with
the following initials have been forwarded to the Patent Office during the week ending Saturday, April 1:-
D. W. K., of Pa.; ; . P. H., of N. Y.; E. J B D. W. K., of Pa.; J. P. H., of N. Y.; E. J. B., of Ky
B. E., P., of Me. ; J. K., of L.I.; N.K., of Pa. ; A. G., of B. E.P., of Me.; J. K., of L.I.; N.K., of Pa.; A. G., of
N. Y.;D. P. B., of Cal.; J. B., of N.J.; H. W., of N. Y.
R. H.C., of N.Y.; W. \&P., of N.Y. J.P. H., of Pa.; J. S.H., of Ind.; S. H.. of N.Y.; W.
 S. T., of Ind.; B. B.P., of Me ; W. \& CO., of O, ; J. L. M.,
of N. Y.; J, E. W., of Mass.; F. Y.S., of Tenn.; F. S. C., of Mass.; G. L., of Pa.; C. D. W., of Ohio; W. V. A.,
N. Y.-The engravings of your several machines are process of execution, and will appear in our columns in
the order in which they were received. Don't get impatient, if some are not published for three or four weeks


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 Remarks-No. 1 in the classification of in-
fluences is the greatest power. The average movement of the influences for the three months ending June 30th, 1854, will be about 892 miles a day-being 28 miles more than the general average, and 36 miles above the aver age for the first three months of the year From this statement of facts there appears to be, in summer, an increased activity manifested in atmospheric circulation, as it relates to the velocity of influence, and the movement of storms.

The longitudinal circulation of the atmosphere has it nodes or places of crossing dis tributed, first, according to certain dynamical laws; and secondly, by the condition of certain relations subject to these laws. The minimum and maximum lines of pressure, as indicated by the barometer, correspond to these nodes, and $\cdot$ likewise travel castward under the influence of the action of the same laws.
Besides the atmospheric disturbances or waves that move around the earth from West to East, there is also another kind of storms that have their origin in the torrid zone, and differ essentially, in the phenomena presented, from the extended ones of temperate climates. Such storms, when rotating out of the torrid zone and visiting the northern temperate regions of the earth, may be called "southwest ers " from the fact that they always approach us from that point. During their prevalence the upper strata of clouds are also sometimes seen, through openings in the lower, moving slowly from the southwest, while the surface current is generally moving with great velocity from the north-east.
These storms are first formed in the torrid zone by the action of the laws of atmospheric influence, and are carried by the trade-winds to the westward with a velocity, said to be less than fifteen miles an hour; with this slow rate of progress, they struggle in these strong currents that flow without ceasing, to the equator but instead of approaching it, as would be in ferred from a glance at the trade-wind system, they recede in a line, forming a curve to the northward, and finally enter the belt of high barometer near lat. $30^{\circ}$ north; being there freed from the trade-wind influence of the equator, they move in a direçt line and with an increasing velocity, to the north-east, if the primary storm influences favor the egress, but if such is not the case they scatter or connect with the ordinary disturbances of our zone
The most favorable time for a visit from a rotating storm, is when two or more of the influences are moving with a space of considerable vacancy intervening. Such a position seems to invite the "southwester" from its
central line of the intermediate space in the belt of high barometer-emerges with the south-west trade winds, and then if it moves it must move towards the north-east.
The first calculations ever published respectting the appearance of one of these storms was verified by the predicted one passing over was verified by the predicted one passing ooti-
the eastern part of the North American contithe eastern part of the North American conti-
nent on the 26th of February last. After it had escaped from the torrid zone and passed the belt of high barometer, it moved to the north-east, between two influences or nodes of minimum pressure, that were travelling with an intervening space of about 9,000 miles, and extending, theoretically, from North to South, Continuing to occupy this central line of vacant space, its north-eastern course is due to the eastward progress of the storm lines in its advance and rear.
meter; and if we inquire for the course we
will find it existing in the physical condition of will find it existing in the physical condition of
the earth and atmosphere, and in their adaptation to the effects of those peculiar forces that induce storms to travel eastward in every part of the globe.
With this explanation of the rotary theory of storms, the problem involving the laws and conditions of the phenomena accompanying "southwesters," is solved so far, that isolated facts, and observations can no longer be depended upon; but in analyzing any theory of storms, the whole system of atmospheric circulations must be brought into view, and the deductions made in accordance with the principle adduced, from the theory of atmospheric influence.
Athens, Menard Co., Ill.
[This communication came too late for pub-
The cyclonic action of storms is only mani- lication in the last number of the "Scientific fested between the tropical belts of high baro-|American

## BARTHOLOMEW'S IMPROVEMENT IN WATER CLOSETS.



The annexed engraving is a side elevation partly in section of an improvement in water closets, for which one patent was granted to F. H. Bartholomew, of this city, in 1846, and an other on the 14th of last Febiurary, (1854). The engraving represents a double valve arrangement.
A is the basin,B double valve, C supply pipe D three-quarter inch Pipe connecting the valve with air receiver G; E three-quarter inch pipe through which the water is discharged with force from the receiver through the cock in to the Basin; $F$ is the waste-pipe into the trap above the water; $H$ the rod by which the valves are operated by the weight of a person on the seat. The receiver may be made of four inch lead soil pipe, four feet long, more or less, so as to be of about double the capacity of the

quantity of water desired to be used each time. is therefore discharged into $\mathbf{A}$ while a person is a valve opening inwards, in G,for the purpose of admitting air into the chamber, and keeping it charged with the same, in case the water should not all run out, or in case the air should from any cause be expelled. This valve may be inserted in any other part of the air chamber, hut it seldom requires to be used.This double cock is designed to avoid the great waste of water which attends the use of most kinds of cocks, and is a desirable article in all places where the economical use of water is desideratum. These cocks consume a limited quantity of water each time the closet is used, taking no more water whether the seat is set upon one hour or one minute, no water being thrown into the basin while the seat is set up-
wh
When the valve is pressed down by the seat, he water passes from the supply pipe $C$ through $D$, into the chamber G, until the air in it becomes so compressed as to balance the pressure of water in the supply pipe when the inlet How of water will cease, however long the upper conical valve may be left open. No water
is seated, but upon the removal of pressure from the seat, the upper valve, by the spring on the stem below, is forced up into its seat, and then communication is opened between the pipe $D$, and the one $E$, leading into $H$. The pressure of the air in $G$, therefore forces the water into A , and thus, the quantity of water for washing out is always graduated by the supply pressure, for the purpose set forth.
By the use of this valve and receiver, the use and expense of the cistern, service-box, valves, cranks, ball and ball cock, overflow-pipe, levers, \&c. are avoided-the whole of this fixture (except the receiver) being placed under the seat out of sight, making a cheap and simple, arrangement. The water cannot overflow, there being no opening for it except into the waste tube or into the basin, and consequently should the valve become leaky, it cannot wet the floor, but must leak only into the discharge-pipe, keeping the floor dry. One-Service pipe will supply any desired number of these double valves, and not prevent a proper force of wa-

This double valve aparatus is not likely to freeze, as the receiver is always empty during the night and whenever not in use, the waste tube discharges all the water above the valve. These apparatuses are extensively used, and are applicable for private houses, and public buildings, in various places. They are made by the patentee, at No. 84 Marion-st., this City, where more information may be acquired re pecting them.

## Lowell Spindles.

The number of spindles run by the incoporated companies at Lowell is 349,898 ; number of males employed, 4607 ; number of females employed, 8743 ; total 13,250 . There are 2,100, 000 yards of cotton cloth, 27,000 yards of woolen, 25,000 yards of carpet and 50 rugs made per week, for which there are consumed weekly 700,000 pounds of cotton and 99,000 pounds of wool. The population of the city is about 35,000 .

A shock of earthquake was experienced in Macon, Ga., on the 20th. It lasted 40 seconds. No damage was done.

## LITERARY NOTICES.




 C. Merrian, of Spo. Spingeid, Mass., for copies of this old
familiar acquaintance. COACHMAEER's Guide-This is a work which is pub-
lished yearly by C. W. Saladee \& Co., of Columbus, Ohio.
 next. This publication is one on the most useful in ou
country, and we heartily commend it to the atten tion
of allcoach
Prienological Journal AND WATRR CURE Journal
TThese interesting monthlies are issued with grea
promptness by Messrs Fowlers Wells of this city
 Which will be found
of each, $\$ 1$ a year.
Houscroid Worps-April number just received from
McEIIrath \& Barker. No . 17 Spruce street. The present number completes the volume of this valuable and inte-
resting publicatlon. and it itherefor a god time to
subscribe. A new story entitlod Hard Times." by
stor Charles Di
the work.
That Shipbuilders Manval,-The twelve numbers o



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Nal of the arts, sciences, and mechanice having for its object the advancement of the interests of mechanics, mandfacturers and inventors.
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being illustrated in the Scientific American. It also contains a Wekkly List of AMERICAN PATENTS; notices of the progress of all MECHANICAL AND SCIents; and Use of all kinds of MACHINERY, TOOLS, \&c. \&c.
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